TECH,**TEACHERS** *&* TEENS:
bridging the divide

Schools must adjust instruction in ways that help students prepare for an information-rich future rather than an industrial past.

In past decades, the "digital divide" referred to the gap between those who could afford access to technology and those who could not. The divide has shifted in recent years to reflect the growing technological chasm between teachers and their students: today's schools and teenagers' worlds.

The digital divide is widening and deepening exponentially each year, creating schools as outdated to teenagers as a Model T assembly plant is to modern industry. To "mind the (technology) gap" between schools and youth, educators must recognize changing conditions and adjust instruction in ways that help students prepare for an information-rich future rather than an industrial past.

Why schools need to integrate technology

Several research studies have linked classroom technology use with improved academic achievement (Schacter, 2001). While parents and students increasingly demand technology use in classrooms (Chap-man *et al.*, 2010), large numbers of teachers lack the technical skills needed to effectively integrate technology into their classrooms (Weiss *et al.*, 2001).

Today's screenagers – sometimes called the www (whatever, whenever and wherever) generation (March, 2006) – are too fast-paced to sit patiently by while their teachers ask them to memorize and regurgitate, to take ink-and-paper notes, and to turn off their digital worlds for six or seven 55-minute chunks each day.

Today's teens are glued to their screens, which are often more interesting, real and relevant than a traditional classroom. Screenagers resist slowing down, powering off, and stepping back into a system designed for a nation transforming from an agrarian to an industrial society.

Model T education has lost relevance. High school graduation rates in the United States hover at about 70 percent. It is esti-

By Amy Colcord Stuht and Cean Colcord

mated that today's students will change jobs more than 10 times by the time they are 40 years old, and that the top 10 jobs of 2010 did not exist in 2004.

Linda Darling-Hammond (2010) summarizes the case: "The new mission of schools is to prepare students to work at jobs that do not yet exist, creating ideas and solutions for products and problems that have not yet been identified, using technologies that have not yet been invented."

Students are already tapping into the tools they need to prepare for the future, but most schools are meting out punishment when students use them. Many high schools ban cell phone and iPod use on campus and employ intricate firewalls that block access to useful sites. Adults expect teenagers to self-regulate, to come to class eager to sit and focus without the screens that motivate and interest them. Teachers and administrators are working at cross purposes by developing rules and policies against technology use.

Setting goals to motivate students

Self-regulation is guided by the students' ability to set goals. Theorists cite three types of goals: mastery goals, performance goals, and avoidance goals.

• Mastery goals (intrinsic): Encourage students' intrinsic desire to master the concepts, procedural skills and base knowledge that define a topic.

• Performance goals (extrinsic): Create a desire to perform or to get through the required material in order to move along.

• Avoidance goals (extrinsic): Grow from the desire to not "look stupid," or be punished for poor performance.

Teachers and parents commonly attempt to motivate students through external avoidance and performance goals, ignoring the more transferable and powerful intrinsic motivators – mastery goals – that technology can cultivate. Current accountability schemes for students, teachers and schools focus on avoidance and performance goals to the detriment of mastery learning.

Hoffman and Nadelson (2009) identified four principles that affect motivational engagement for K-12 students who use educational technology such as video games. In their research, a mixed methods study, 189 students indicated that educational video games are socially captivating, challenging, promote positive affect and cognition, and fail to promote negative consequences typically associated with task failure.

In order to set goals, learners must believe they can learn or perform a required task, and have the confidence they will experience success when they do. Learners must have the ability to use different strategies and to know when to employ the most effective method in their "arsenal."

Such self-efficacy skills are highly situational, fluid and creative. They are most often encouraged by project learning and access to

the array of information and communication options available through technology.

Professional developers mistakenly act as if adults learn differently than do other age groups. Often instructors believe adults are significantly more intellectually curious, motivated to learn, willing to take more responsibility for their own learning, and willing to work hard. This is typically not the case; adults respond more proactively when instructors use motivating strategies and techniques (Wetzel, 2009).

Offering adults experiential learning

What we know about conditions that motivate adults is eerily similar to what we know about motivating teenagers. Adults want action or experiential learning grounded in meaningful, real-life problems. They want flexibility in time, place and teaching/learning strategies. Traditional "sit and get" professional development is no more effective as a dominant learning strategy for adults than it is for teenagers.

In order to experience the intellectual discord that causes teachers to spend the time and energy to adopt new ideas and learn new strategies, they must recognize that there is a discrepancy between "what is" and "what is needed." They must move beyond their own avoidance and performance motivators (such as federal, state and district assessment systems) and move into the arena of intrinsic mastery learning.

They must be self-efficacious: They are not at the mercy of students' poverty or parental neglect, holes in students' previous schooling, or the host of other "yeah, buts" trotted out as excuses for powerlessness.

Kick-starting change

Although we know adult learners, like teenagers, prefer to make their own choices about when and if to learn, sometimes an edict from the top can effectively kick-start change. For example, former California Gov. Arnold Schwarzenegger called for textbook companies to create digital textbooks. Such a shift could potentially increase curricular access for teachers and students alike. Teachers could be forced to enter the digital world, ready or not, in order to access the basic course textbook.

Teacher isolation, lack of time to develop lesson plans and grade papers, and increasing bureaucratic demands sap the life out of many well-meaning professionals, but technology can provide information and support with the click of a mouse.

In Bakersfield, the superintendent observed his wife, a teacher, transporting boxes of papers, texts and other materials needed to create lesson plans each week. He tasked his district-level personnel with creating a digital site where teachers could share lesson plans and access curricular materials.

The result was a partnership with Houghton Mifflin Harcourt, who developed a tailored site called "Learning Village" exclusively for Bakersfield teachers, students and parents. A side benefit of Learning Village was the additional strength the site lent to the Bakersfield professional learning community (Lingo and O'Callaghan, 2010).

The Internet has been helping young people make sense of the world around them by giving them the opportunity to construct,

collaborate and dissect information quickly and efficiently. It has become an important part of the educational experience of many teenagers. In remote rural areas across the country and worldwide, the Internet has become the classroom for many K-12 students.

In recent years, K-12 online learning programs have shifted the focus away from contemporary face-to-face classrooms and replaced them with full-time online programs or blended learning programs. According to the U.S. Department of Education, K-12 online classrooms are growing at a rate between 20 to 45 percent annually. Furthermore, 57 percent of public secondary schools provide online learning options for their students (Watson and Ryan, 2007).

In addition to online learning, Web-based educational technologies continue to expand K-12 learning experiences. Ferriter (2010) suggests that teachers spend some time exploring websites, wikis, Twitter and other social networking sites. Those activities will establish the power of technology as a way to share resources with others, increase differentiation, establish ownership and motivation, provide intellectual challenges, and above all … save time. A few hours spent playing an action video game can also provide insight into the effect technology has had on the attention span, brain development, and perspectives of today's teens.

Professional development, or who does what to whom and why

The role of district- and site-level administrators may vary as our schools lurch into the 21st century. Once the need for increased technology proficiency is established, professional development may come in the form of traditional university course work, formal school or district professional development, grade-level or department-level supports, small learning community efforts, or small group or one-on-one tutoring. Sessions can be in person or online. One such method, the multi-tiered approach for professional development, calls for multiple processes to sustain and reinforce new knowledge and skills (Lieberman and Miller, 1999).

Long-term systemic pedagogy is constructed using a variety of models, such as in-service workshops, job-embedded peer coaching, and developing partnerships with professional networks or specialists.

The series of workshops and year-long technology coaching models provide extensive opportunities for teachers, administrators and district-wide technology coordinators to create time for extended learning activities, in-class observations, continued practice, feedback, lesson development, and curriculum integration necessary to promote meaningful change.

Few teachers implement new ideas learned in traditional training settings like one-time workshops because practitioners are not confident enough to apply what they learn in these workshops and they receive no feedback when they do experiment with new methods. Many school districts are now offering long-term professional development along with support from coaching by district technology coordinators.

The methods demonstrating the most

impact on teacher behaviors are not one-time sessions, or even a series of workshops or conferences. Even summer institutes show little or no impact on teacher practices. What leads to most implementation appears to include coaching, job-embedded action research, and networks (Speck and Knipe, 2005).

In order to build a teacher support system, the Bakersfield director of curriculum and instruction scoured the nation to see what other districts and states were doing to create collaborative teacher websites, and then worked with teachers and the textbook company to create a "dashboard" with all of the links and resources his teachers wanted to access. The resulting site was introduced through three voluntary two-day summer institutes and supported by district networking (Lingo and O'Callaghan, 2010).

There is a distinct gap between the professional development school districts offer and what they require. For example, Manzo (2010) reported that while more than 80 percent of districts offer professional development in integrating technology into instruction, developing curriculum plans that include technology to address the standards, and applying technology to assess student achievement, fewer than 40 percent of those districts mandated teacher participation.

Still fewer – less than 20 percent – of teachers participated in professional development in content-specific software tools, Internet resources and tools for instruction, and using technology to support collaboration.

Significantly, 83 percent of school districts provided professional development in using technology to access or manipulate data to guide instruction, but only 32 percent of teachers participated (Manzo, 2010).

Paying the piper

The shopping list for schools to move into the world of technology is long, and the costs are staggering. Many districts are extending their hardware replace or repair cycles, or entering into "lease-to-own" agreements.

Those in K-12 districts may choose to move older machines to elementary schools where applications are not as stressing (word processing/Excel vs. high-end use for high

school students), and reserve new machines for older students (Davis, 2010). Additionally, E-rates available to schools help them afford connectivity at discount cost.

Another avenue for growth could lie in partnerships with publishing companies (Lingo and O'Callaghan, 2010). Textbook deals can include technology packages and the professional development options to support implementation and use.

Federal stimulus money, which is not a yearly source of revenue, is another option for some districts to fund technology growth. By investing federal stimulus funds in people – through coaching and other professional development – some districts produce measurable student results that are likely to continue into future years when that money is no longer available (Foxman, 2010).

Finally, student-owned devices, now

the catalyst for many student discipline referrals, could be used in the classroom as a learning tool (Ash, 2010). Hardware that students might already own does not cost schools; however, issues of equity between more affluent and less affluent students become exacerbated if schools rely solely on student ownership.

The payback in student learning is worth the effort school leaders put into funding and supporting professional development and hardware for expanding instructional technology. Our society and industry demand it, and our students deserve it. ■

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Amy Colcord Stuht is an assistant principal at Jordan High School in Long Beach, assigned as the site administrator for the 830-student ninth-grade academy near the main campus.
Cean Colcord is an elementary special education teacher in Phoenix, AZ, and an adjunct faculty at Arizona State University, where he is a doctoral student in technology in education.